

Abstract

Directional Display Apparatus

A birefringent lens structure comprises a birefringent lens array capable of directing light of a given polarisation into a directional distribution, the birefringent lens comprising a solid birefringent material and an isotropic material having an interface having a refractive structure. A switchable liquid crystal layer capable of rotating the polarisation of light passing therethrough is arranged adjacent the first birefringent material. The interface between the birefringent material and the liquid crystal layer has an alignment microstructure providing alignment of the birefringent material and the liquid crystal layer. A pair of electrodes for applying an electric field to switch the liquid crystal are arranged with both the lens array and the switchable liquid crystal layer therebetween and a conductive material is incorporated in the lens array to reduce the voltage drop across the lens array. To reduce reflection, the interface between the birefringent material and the isotropic material has an interface having alignment microstructure providing alignment of the birefringent material, and the refractive index of the isotropic material is substantially equal to the extraordinary refractive index of the birefringent material.